DISCUSSION OF THE CLAIMS

Support for amended Claims 8, 11, 13 is found at specification page 11, lines 13-15 and page 22, lines 13-16. Support for new Claim 16, 18, 21 is found at specification page 21, lines 6-10 and original Claim 7. Support for new Claim 17, 19-20, and 22-23 is found in original Claim 10 and in Fig. 8 of the specification where a thickness of a TaC layer is 55 μm and a thickness of Ta_2C layer is 30 μm. Claims 9-10, 12, 14 and 15 have been amended to place the claims in a better format for examination on the merits. Claims 1-7 are canceled. No new matter has been added.

REMARKS/ARGUMENTS

The rejection of Claims 8-10 and 11-15 under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, rejected under 35 U.S.C. 103(a) as being unpatentable over Douglass et al (US 3,163,563), Lopez et al. (US 5,916,377), Murakami et al (US 5,973,400) or Garg et al (US 5,126,206) is traversed.

US'563 discloses a composite structure having a carbide layer on a tantalum metal. However, US'563 does not disclose a tantalum carbide material comprising a TaC layer having fibrous crystals grown in different directions as in amended independent Claims 8, 11, and 13. In detail, US'563 discloses that the composite structure is obtained by carburizing a tantalum metal with methane at a temperature of 2300 to 2500 °C (see US'563, Col.3, lines 16-21 and Table 1).

On the contrary, Applicants disclose "heat-treating the tantalum or tantalum alloy by introducing a carbon source into the vacuum heat treatment furnace to have carbon penetrate the surface of the tantalum or tantalum alloy" to obtain a TaC layer having fibrous crystals grown in different directions on a surface of the tantalum or tantalum alloy as in amended Claims 8, 11 and 13. Additionally, Applicants disclose that the heat-treatment is carried out at a temperature of higher than 1860°C and less than 2300°C (see new Claim 16). Furthermore, the newly submitted declaration demonstrates that the composite structure of US'563 does not have a TaC layer on the surface of the tantalum alloy but has a thermally decomposed carbon layer on the surface of the tantalum alloy. The results in the declaration show that the method by US'563, forms a thermally decomposed carbon layer first prior to forming carbide layers on a surface of the tantalum metal. Thus, in US'563, carbide layers would not be on a surface of a tantalum metal but rather would on a thermally decomposed carbon layer formed on the surface of the tantalum metal.

Therefore US'563 does not disclose or suggest a tantalum carbide material comprising a TaC layer having fibrous crystals grown in different directions on a surface of a tantalum or tantalum alloy as in amended Claims 8, 11, and 13 and the dependent claims therefrom.

Lopez discloses a method for producing a corrosion-resistant tantalum or tantalum alloy. However, Lopez does not disclose or suggest a tantalum carbide material comprising a TaC layer having fibrous crystals grown in different directions on a surface of a tantalum or tantalum alloy as in amended Claims 8, 11 and 13. Additionally, Lopez discloses that (see Lopez, Col.3, lines 19-25):

> FIG. 1*a* shows a reflective light photomicrograph (×250) of a cross section of a tantalum crucible after carburization for 10 hours at 1700° C. The thin, topmost layer of the surface of the carburized crucible is a TaC layer, the thicker, middle lightly colored layer is a Ta_2C layer, and the thickest, bottom layer is carburized tantalum which appears as a collection of grains having Ta_2C along the grain boundaries. Additional Ta_2C appears within the grains.

As described above, Lopez obtains a thin TaC layer on a thicker Ta_2C layer which is on a surface of a substrate by carburizing the substrate at 1700 °C. However, Lopez does not disclose a TaC layer on a surface of a tantalum or tantalum alloy as in amended Claims 8, 11 and 13. Furthermore, Applicants disclose that a thickness of a TaC layer is thicker than that of a Ta_2C layer when Ta_2C and TaC are present on the surface of the tantalum or tantalum alloy (see new Claim 17). Lopez fails to disclose or suggest such TaC and Ta_2C layers. Thus, Lopez does not render anticipated or obvious amended Claims 8, 11 and 13 and the dependent claims therefrom.

Murakawi discloses a semiconductor device comprising a wiring layer whose main component is copper being formed on a base via a barrier layer of amorphous tantalum carbides (see Murakawi, Claim 1). Garg discloses a coated substrate comprised of a parent

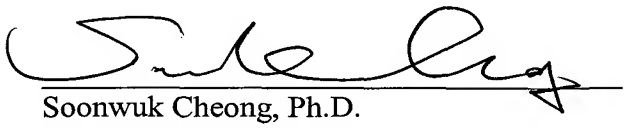
substrate and a polycrystalline diamond layer (see Garg, Claim 1). However, Murakawi and Garg simply fail to disclose a tantalum carbide material comprising a TaC layer having fibrous crystals grown in different directions on a surface of a tantalum or tantalum alloy as in amended Claims 8, 11 and 13.

Withdrawal of the rejection is respectfully requested.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.
Norman F. Oblon



Soonwuk Cheong, Ph.D.
Registration No. 62,793

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/09)